

Web-Based Work Practice Report Guidance Management Information System in Schools Using the Waterfall Method

Markani¹, Juli Wanda², Listia Utami³, Tamra⁴, Liam Johnson⁵

¹Information Technology Education, Universitas Teknologi Akba Makassar, Makassar, Indonesia

²Informatics Engineering, Universitas Teknologi Akba Makassar, Makassar, Indonesia
³Computing and information systems, Athabasca University, Athabasca, Canada

Abstract

In the current digital era, managing guidance on Field Work Practice (PKL) reports at SMKN 5 Takalar requires a more structured and efficient system. Conventional methods often lead to ambiguity in communication and scheduling, as well as a lack of good documentation. This research aims to develop a web-based PKL report guidance management information system at SMKN 5 Takalar using the Waterfall method, which includes the stages of needs analysis, design, implementation, testing, and maintenance. This system is designed to overcome the problems of lack of clarity in communication, scheduling, and lack of good documentation in guidance on PKL reports. The research results show that this system is able to make the guidance process more structured with interpretation results of 94%, well documented, and efficient. The features provided facilitate communication between students and teachers, track guidance progress, and improve the quality of PKL reports. Apart from that, this system also optimizes the arrangement of meeting schedules between supervising teachers and students, making it more efficient and structured. Thus, it is hoped that this web-based PKL reports guidance management information system can be an effective solution to overcome the problems faced in the PKL guidance process at SMKN 5 Takalar.

Keywords: Management information System; Waterfall Method; Guidance management; Schedule management; Report quality

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Introduction

Field Work Practice (PKL), which is often known as PKL, is an educational program that aims to provide students with the opportunity to apply the knowledge and skills they have learned at school in real work situations in industry or related organizations (Bashith, 2017; Nawawi, 2021). This program is designed to bridge the gap between theory taught in the classroom and practice in the field so that students can gain hands-on experience and a deeper understanding of how their knowledge is used in a professional context (Apriliani, 2019; Pahlephi, 2022; Sari & others, 2024). PKL usually has a certain duration which can vary, from a few weeks to several months, depending on the policies of each school (Prayogo, 2022; Winter, 2023). While undergoing PKL, students will receive guidance from a supervising teacher appointed by the school (Susanto et al., 2016; Mutahhari et al., 2021; Juniardi, 2023). This supervising teacher has an important role in supporting students (Rudi et al., 2022), provide direction, and assist in the process of preparing PKL reports (Setiyaningrum et al., 2018).

A PKL report is an official document prepared by students as a result of their PKL activities (Iskandar, 2022; Yazidtech, 2023). This document not only functions as a form of reporting but also as a reflection tool for students to analyze and understand their experiences while working in the field (Rohman, 2022). The PKL report usually contains detailed descriptions of the tasks and activities that have been carried out, analysis of work experience, as well as personal reflections regarding the learning and development experienced during the PKL (Hasbimutsani, 2019; Scientific, 2024). Through this report, students are expected to be able to articulate the knowledge and skills they have acquired, as well as identify the challenges faced and the solutions that have been implemented. Apart from that, the PKL report also functions as an evaluation tool for schools to assess the extent to which students are able to apply theory in practice (Neliwati et al., 2023).

*Corresponding author.

E-mail address: markani@akba.ac.id (Markani)



The main purpose of preparing a PKL report is to convey students' fieldwork experiences to interested parties, such as supervisors, schools, and institutions where the PKL is carried out.(Arianti, 2023; Fachruzi & others, 2022). This report is written evidence of student involvement in PKL activities and their contribution to the workplace(Soedarma et al., 2023; Fadlianty Yahya, 2020). The supervising teacher will assess this report to provide constructive feedback, helping the student understand strengths and areas for improvement(Selfiani, 2016). In addition, PKL reports can also be used by schools as evaluation material to improve PKL programs in the future, ensuring that the experience students gain is truly relevant and beneficial for their professional development.(Arifin, 2023; Istiqfarah, 2024). So, the PKL report is not just an academic assignment but is also an important component in a continuous learning process(Riadi, 2021).

In working on the report, students need to consult or provide guidance to the supervising teacher who has been determined by the school(Maryati, 2010; Maralih, 2014). The aim is to help students in working on their thesis in a more focused manner so that the expected results can be achieved and as expected. In a report guidance process, there is a guidance time limit that has been set based on the school's schedule(Zulkarnain, 2022). However, there are some students who work on the PKL report for longer than the specified time, for the reason that the guidance process is difficult, so these students cannot do it quickly.(Dimas, 2024).

At SMKN 5 Takalar, students provide report guidance by meeting directly with their supervisor. However, sometimes there are obstacles in the guidance process, such as the supervising teacher being busy with other activities, the distance is quite far and the supervising teacher is very slow in responding, which results in the reporting guidance process not being able to run smoothly and on time, so these obstacles sometimes become a problem. The purpose of this research is to develop a PKL report management system that can make it easier to process student reports. It is also hoped that this application will make it easier for students and supervising teachers to be able to carry out guidance without meeting face to face/meeting in person so that it can simplify and speed up the process of making internship reports.

This research is in line with researchKhairi (2020), Design of a Web-based Field Work Practice Report Guidance System at SMKN 2 Kraksaan with the results of this PKL report guidance system being able to help and simplify the guidance process and print reports with a feasibility percentage of 83.6% with very feasible interpretation. Next on researchMaharani et al. (2018)said that the system being built can simplify the Field Work Practice (PKL) business process without having to use manual methods, such as PKL registration. This system displays the required information, manipulates data related to PKL activities, and makes it easier to report the number of PKL students and obtain information about supporting stakeholders or locations that students have previously visited.(Mutoffar et al., 2019). Based on the background that has been described by the author, "Web-Based Management Information System for Guidance of PKL Reports in Schools Using the Waterfall Method" is a solution to existing problems.

Method

The method used in this research is the Waterfall method. The Waterfall method is a classic approach to software development(Stober et al., 2010; Borecky et al., 2016; Senarath, 2021; Wahid, 2020). This approach describes a linear development sequence and flow, where each phase must be completed sequentially before moving on to the next phase(Huda, 2023; Ramadan, 2023; Meilinaeka, 2023). The Waterfall method consists of a series of phases such as requirements analysis, design, implementation, testing, and maintenance(Bolung & Tampangela, 2017; Star, 2023). Each phase produces documents or work results that become input for the next phase. In the Waterfall method, project requirements are defined thoroughly at the beginning and are kept stable throughout the development cycle. This approach is suitable for projects with clear and stable requirements, where significant changes are rare.

The advantages of the Waterfall method include comprehensive documentation, clearly structured development stages, and easier project control(Techno, 2021; Agency, 2024). However, the limitation of the Waterfall method lies in the limited flexibility in accommodating changes in requirements that may occur during the software development process(Sutiono, 2023; Iqbal, 2023). In recent years, more adaptive and collaborative software development approaches such as Agile have become more popular. This approach is able to overcome the limitations of Waterfall and provide a better response to changes that occur during the development process.

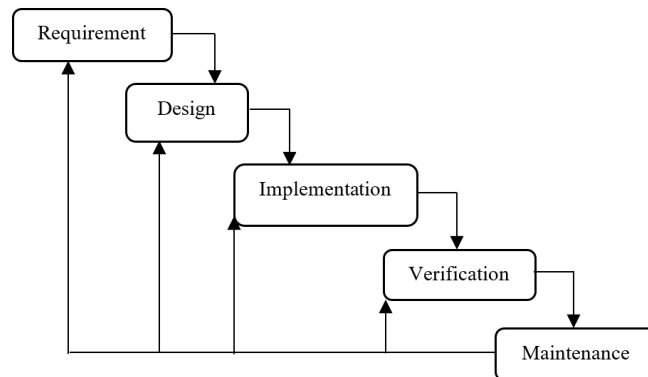


Figure 1. Stages of the waterfall method

The following are the stages of the Waterfall method used to design a web-based management information system for guidance on fieldwork practice reports at SMKN 5 Takalar:

Requirements

At the requirements stage, an analysis of the systems required by the community is carried out by involving interviews with users, namely SMKN 5 Takalar, to obtain the required information. The data collected is then analyzed to understand the needs of the system, which includes collecting information from the school, supervising teachers, and students regarding their needs and expectations of the system. The results of this analysis are used to prepare a clear and detailed requirements specification document and ensure that all identified requirements are in accordance with user expectations so that they can become the basis for designing and developing a management information system for guidance on web-based fieldwork practice reports.

Design

At this stage, system designs are carried out such as use cases, activity diagrams and system interfaces which can be seen in figure 2, figure 3 and figure 4.

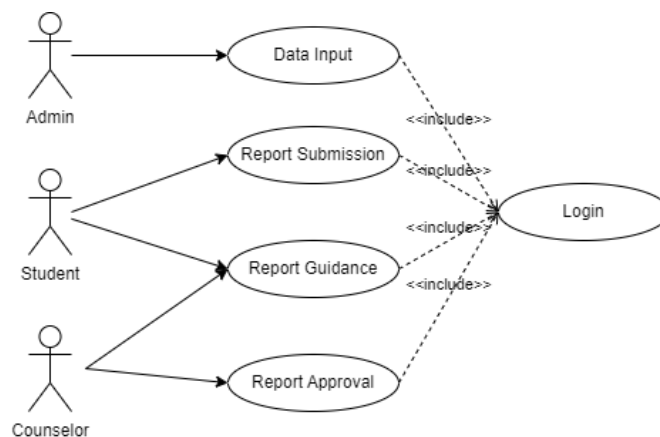


Figure 2. Use case diagram

This use case explains the interaction between actors (users or other systems) and the system being created (Setiyani, 2021). Use case diagrams help understand user needs and how the system will interact with those users (Bittner & Spence, 2003). In Figure 2 the use case diagram shows the interaction between the user and the management information system for guidance on web-based field work practice reports at SMKN 5 Takalar. There are three main actors: Admin, Student (student), and Counselor (guide). The admin is tasked with inputting data, students access the report delivery and guidance function, and the supervisor approves the report. All actors must log in first before they can access these main functions. The <<include>> flag indicates that login is a prerequisite for any activity performed by the actor.

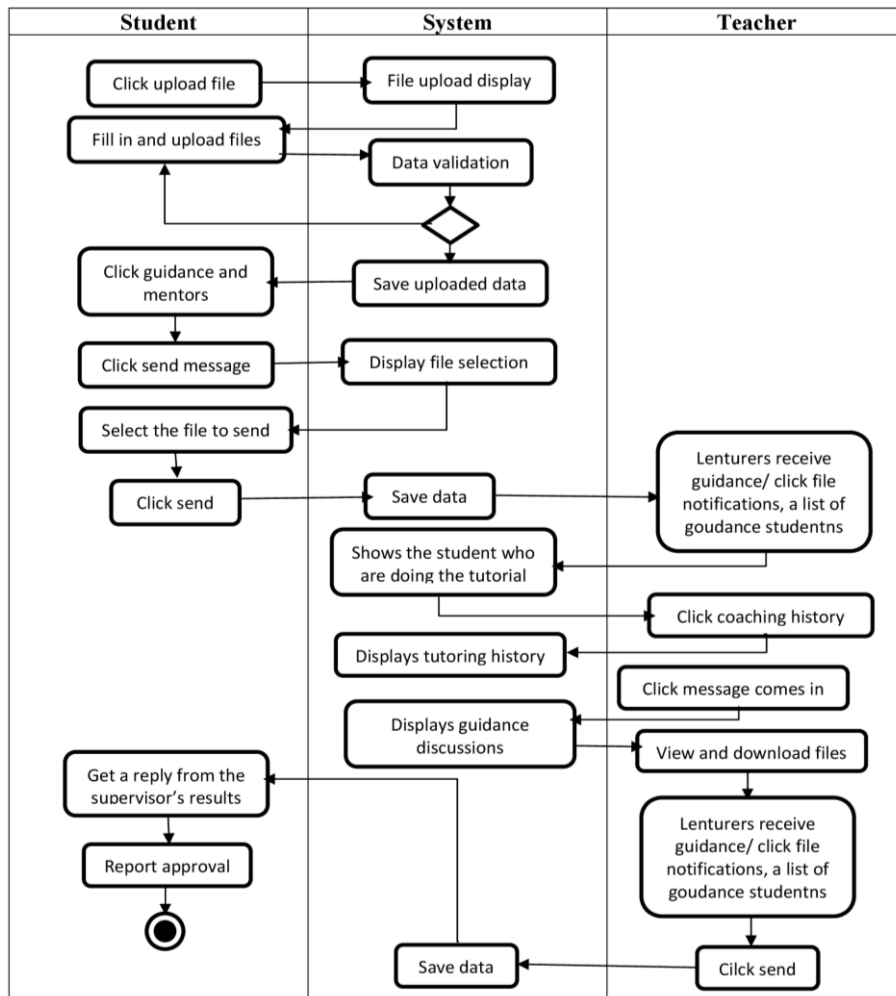


Figure 3. System activity diagram

Activity diagrams are one of the diagrams in the Unified Modeling Language (UML) which function to describe work flows or activities in a system (Firdausi, 2024). This diagram makes it easy to visualize the steps or activities that occur in a process as well as the relationships between these activities (Group, 2017). In Figure 2 the activity diagram depicts the flow of the guidance process for field work practice reports between students, the system and the supervising teacher. Students start by uploading a report file, which is then validated by the system. After the file has been successfully uploaded and saved, students can send guidance messages by selecting the file they want to send. The system stores this data and displays a list of students who are being tutored. Supervising teachers receive guidance notifications, view and download files, and send replies after reviewing reports. Finally, students receive a reply from the guidance results, and the report is approved by the supervisor.



Figure 4. Home page interface

Designing a system interface aims to make system use easier and more efficient for users. A good interface makes it easier for users to understand and use the system, reduces errors, and increases productivity (Tidwell, 2005). Additionally, a consistent design reflects the brand identity and ensures everyone, including those with disabilities, can access it (Scott & Neil, 2009). Overall, an effective interface helps users learn, adopt, and interact with the system better. In Figure 3, designing the home page interface is a simple development process for the system that will be created, namely a web-based street vendor guidance management system.

Implementation

At the implementation stage, the planned program will be implemented and tested to ensure the program functions well. This implementation uses the black box method. Black box testing methods focus on testing the functionality of the software without looking at its internals or how it works. This approach ensures all user needs are met by testing various input scenarios and checking the results.

Verification

At this stage, all units that have been developed during the implementation phase will be combined into one system after each unit has been tested. Once the integration is complete, the entire system will be tested to ensure its effectiveness by asking the user several questions.

Maintenance

At this stage, the system that has been created will be prepared to be operated routinely. System maintenance will be carried out to ensure that the application runs well every day, including security. Maintenance activities include regular checks, system updates, bug fixes, and feature improvements based on user feedback. These maintenance steps aim to ensure that the application remains relevant and efficient in supporting the guidance process for fieldwork practice reports at SMKN 5 Takalar.

Results and Discussion

Results

After analyzing requirements and designing the system from a software engineering perspective using the Unified Modeling Language, and interface design, the next step is to implement the system, including the coding process. The results of research on the web-based management information system for guidance on fieldwork practice reports at SMKN 5 Takalar using the Waterfall method are as follows:

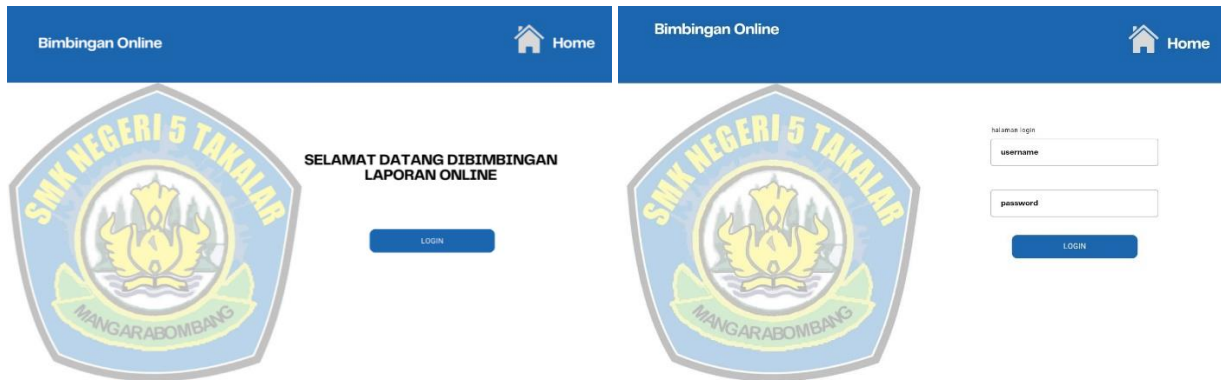


Figure 5. System home and login page

In Figure 5 the home page and home system login are the first pages that appear in this application. Displays information on the online guidance page of the PKL report. The Login page displays to fill in the username and password which can be accessed by Admin, Teachers and Students.

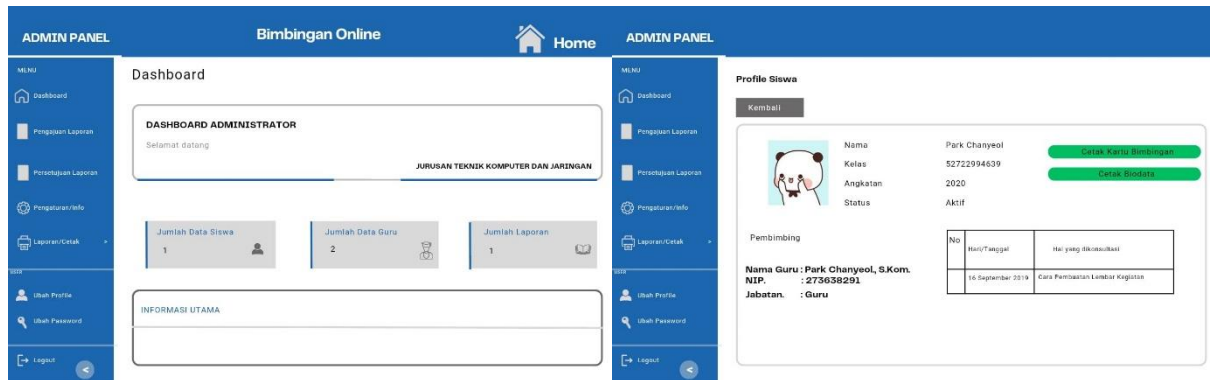


Figure 6. Admin and student dashboard page

In Figure 6, the admin and student dashboard pages. The dashboard page in the admin is the admin's main page displaying information about the number of students, the number of teachers, and the person who takes the report. The Student Dashboard is a display of the Student page regarding information on lecturer recommendations, title submissions and title submission status.

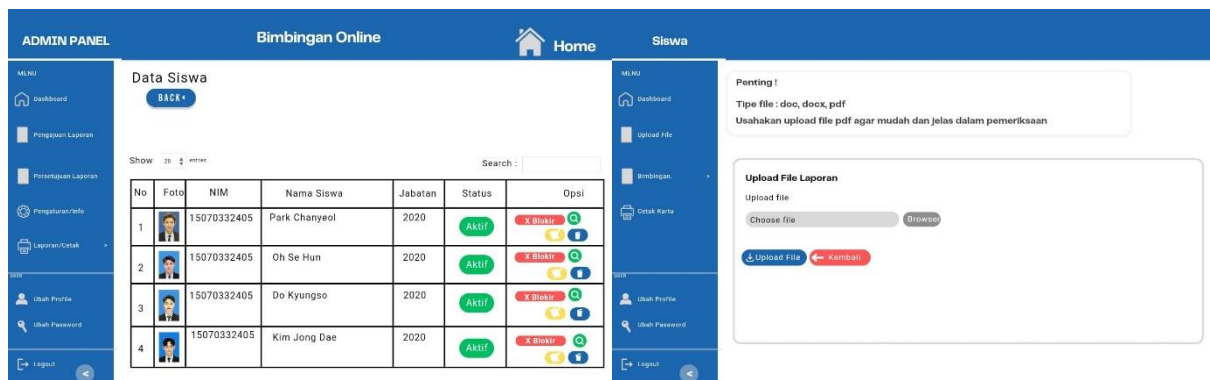


Figure 7. Student data page and student file upload

The student data page displays information about students who have registered for online tutoring. On this page, the admin can delete, change, and deactivate students. Upload File is a page for students to send guidance data to the teacher.

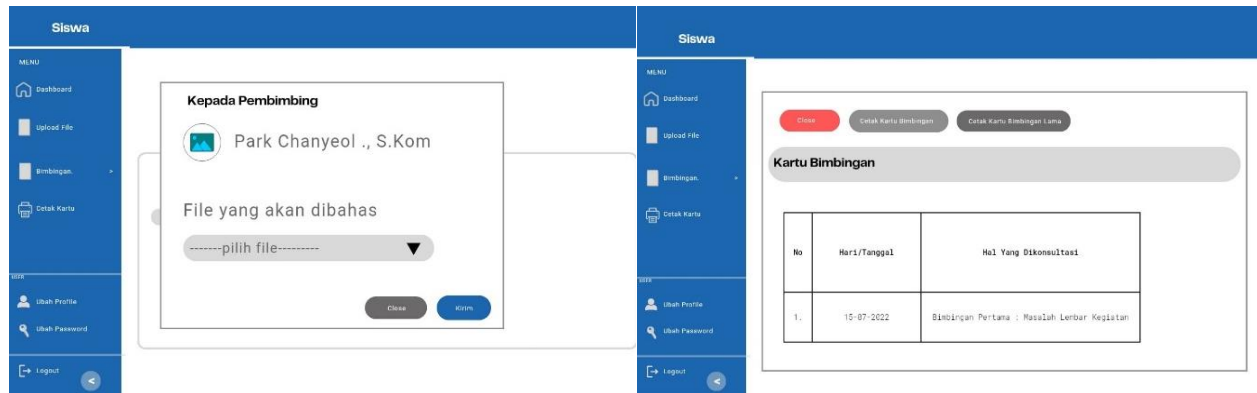


Figure 8. A page for uploading guidance files and printing guidance cards

In Figure 8, upload the guidance file and print the guidance card. The guidance menu display displays the guidance process by sending messages and selecting files to be sent to the supervising teacher. The menu on the printed card is the student's display for activity reports during guidance.



Figure 9. Guidance confirmation page

Acceptance of guidance is a display of approval from the admin for the teacher to become a supervising teacher, and a display of guidance from students carrying out the guidance process to the teacher.

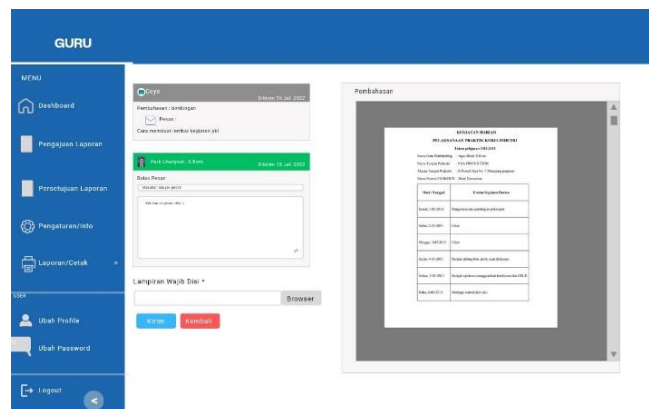


Figure 10. Incoming message page from students to teachers

In Figure 10, the incoming message page from students to teachers is a message from students who are carrying out the guidance process by sending data (files) to the supervising teacher for checking or controlling the supervising teacher.

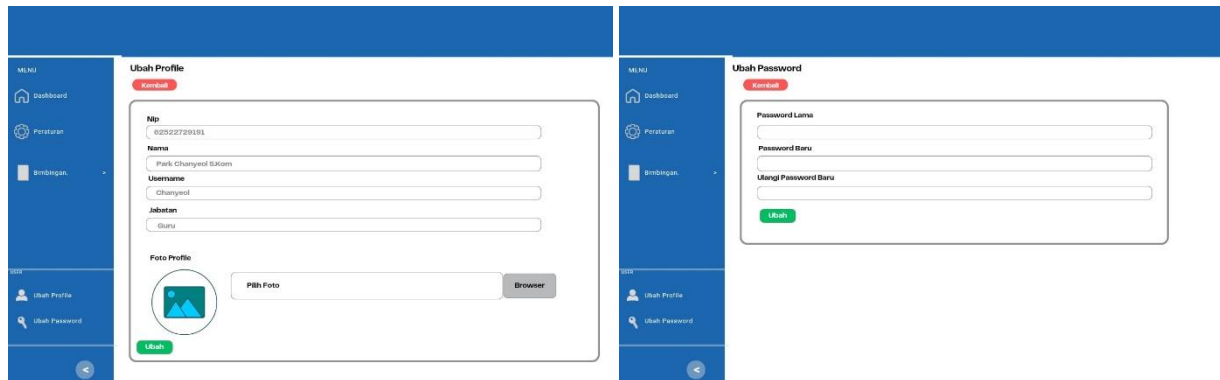


Figure 11. Change profile and change password page

In Figure 11, the change profile and change password page shows the admin, teacher, and student displays for changing the name, username, and profile photo. Change Password is a display for admin, teachers and students to change passwords.

Discussion

This research evaluates the test results of the system that has been developed, in order to develop successful actions for the system. This research uses the black box testing method to test the existing system. The following are the results of testing the web-based fieldwork practice report guidance management information system at SMKN 5 Takalar using the Waterfall method:

Table 1. System testing using the black box method

Description	Testing Activities	Expected results	Observation	Results
Login Page	For admin, students, teachers	Login is successful and the dashboard page displays	Login can be done, the Dashboard page appears	Valid
Admin Data Page	Clicking on teacher recommendations, select a teacher and click select	Can choose a teacher	Choose teacher recommendations	Valid
Teacher Selection	Students can click search for teachers, select a teacher and then click	Can function and display the teacher's name	It works and students can choose	Valid
File Upload Display	Fill in and select the uploaded file	Must fill in the description of the file to be uploaded	It works and the message "file uploaded successfully" appears.	Valid
Send Message View	Clicking select the uploaded file combo box and fill in the description	Successfully sent guidance file	It works and the message "message has been sent" appears.	Valid
Dashboard View	Click the notification message	Successful and can see the message displayed	Functions and appears on the dashboard if someone sends a message or notification	Valid
Message Content Display	Get notified and appear on the dashboard - Clicks, notifications - Displays filled with message - Click download now	Can be downloaded or saved to a computer	It works and the file download appears	Valid
Print Menu Display	- Appears in the print menu - Click print card	Can function and produce results under guidance	It works and the print display appears and can be printed	Valid

Opinions from respondents regarding the Web-based Design of the Management Information System Guidance for Field Work Practice Reports at SMKN 5 Takalar, we can use a Likert Scale as a measurement of their decisions regarding the design. The author uses a Likert scale weight starting from numbers one to five, as listed in the table below:

Table 2. Likert scale

Information	Mark
SS (Strongly Agree)	5
S (Agree)	4
RG (Doubtful)	3
TS (Disagree)	2
STS (Strongly Disagree)	1

Table 3. Questions to users

No	Statement	Select Answer				
		5	4	3	2	1
		SS	S	RG	T.S	STS
1	The design flow is appropriate					
2	The design of the web-based internship report guidance system is easy to understand					
3	The web-based internship report guidance system design has quite complete features					
4	The design of the web-based internship report guidance system provides quite clear information					
5	The web-based internship report guidance system is designed according to existing needs.					

Then the idea score will be calculated and the rating scale will be determined to obtain the following final results:

The ideal score is determined using the formula: Criterion Score = Scale value x Number of respondents

Table 4. Determination of ideal scores

Formula	Scale
5x10 =50	SS
4x10 =40	S
3x10 =30	RG
2x10 =20	T.S
1x10 =10	STS

Next, the rating scale value and the interval distance from the value in the table will be determined.

Table 5. Scale values

Answer Value	Scale
41-50	SS
31-40	S
21-30S	RG
11-20	T.S
0-10	STS

Then, calculations are carried out for each question using the formula Result = Answer scale x Scale value. Total marks are obtained by adding up the results of all questions.

Table 6. Values obtained from respondents

Respondent	Question				
	1	2	3	4	5
1	5	5	5	5	5
2	4	4	5	5	5
3	5	5	5	5	5
4	5	5	5	5	5
5	5	5	5	5	5
6	4	4	4	4	4
7	5	5	4	4	4
8	5	5	5	5	5
9	5	5	5	5	5
10	4	4	4	4	4
Total value	47	47	47	47	47

Table 7. Calculation of answer percentages

Question To -	Answer Percentage
	(Total Score: Total Ideal Score)*100%
1	(47:50)*100%=94%
2	(47:50)*100%=94%
3	(47:50)*100%=94%
4	(47:50)*100%=94%
5	(47:50)*100%=94%
Final	94%

Answer Percentage Scale

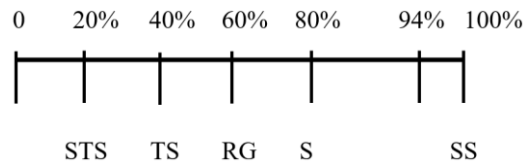
0%-20% = Absolutely NoAgree (STS)

21%-40% = NoAgree (TS)

41%-60% = Doubtful (RG)

61%-80% = Agree (S)

81%-100% = Strongly Agree (SS)



Based on the scale above, the calculation results from the questionnaire which were assessed by 10 respondents and there were 5 statements showed an interpretation result of 94%. This result is closer to the Strongly Agree (SS) and Agree (S) areas, so it can be concluded that the design of the web-based PKL report guidance management information system can be accepted by respondents.

Conclusions and Suggestions**Conclusions**

The results of research into the development of Online Guidance Reports show that designing a program with special features can make the process of guidance for PKL reports more structured, well-documented, and efficient. Students and teachers can communicate more easily, track progress, and improve the quality of PKL reports. Implementation of this mechanism also makes meeting schedules between supervising teachers and students more efficient, allowing for determining suitable schedules, ensuring attendance, and tracking progress during guidance.

Suggestions

There are suggestions that I need to convey so that this application can be better:

1. It is hoped that there will be developments in this application that are more complex so that it can be used well and in accordance with the guidance procedures at SMKN 5 TAKALAR
2. It is hoped that for further research if the implementation of this system is successful in the form of an application, it would be better to add a student work practice location feature so that it is easier for teachers to monitor students

who are carrying out fieldwork practice.

3. The internship report guidance information system that is being developed still has a simple appearance and process, therefore, it is very necessary to carry out further development by adding features where student internships are carried out.

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